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Background/Aims: Ulcerative colitis (UC), a type of inflammatory bowel disease, is characterised by colonic inflammation and ulceration. Orally-administered Emu Oil (EO), extracted from Emu fat, accelerated the intestinal repair process in a pre-clinical model of *acute* UC. We hypothesized that EO would reduce the severity of dextran sulphate sodium (DSS)-induced *chronic* UC in mice.
Methods: Female *C57BL/6* mice ($n = 10$/group) were gavaged with water or EO (80 μL or 160 μL) thrice weekly. Mice were subjected to two cycles each consisting of *ad libitum* access to water or DSS (2% w/v) for one week and two weeks water recovery. Followed by one week water or DSS and mice culled two days later. Bodyweight, blood profile, organ data and myeloperoxidase activity were assessed. $p < 0.05$ was considered significant.
Results: DSS decreased bodyweight (days 6-19 and 26-30; maximum of 24%), compared to normal controls ($p < 0.001$). In DSS-treated mice, high dose EO significantly increased bodyweight (days 6-12), compared to controls ($p < 0.05$). DSS decreased red blood cell count, compared to normal controls ($p < 0.05$); an effect not improved by EO. Compared to normal controls, DSS increased liver (16%), spleen (45%), lung (19%) and small intestine (20%) weights ($p < 0.05$), although EO had no significant effect ($p > 0.05$). DSS increased colon myeloperoxidase activity compared to normal controls ($p < 0.05$), however, EO was unable to significantly reduce these levels.
Conclusions: EO prevented bodyweight loss in this mouse model of chronic colitis, however, was unable to improve other preliminary parameters. Analyses currently underway include chronic inflammatory markers, histological morphometry and cell kinetics.
Funding source(s): N/A.

DIETARY ADVANCED GLYCATION END PRODUCTS (AGES) INDUCE CHRONIC KIDNEY DISEASE (CKD) AND CHANGES IN GUT HOMEOSTASIS

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Background/Aims: Over-consumption of dietary AGEs, which are formed by heat-treatment of foodstuffs, is thought to lead to CKD. Research suggests that AGEs may modulate gut microbiota. The aim of this study was to characterise the effects of dietary AGEs on gut homeostasis and CKD.
Methods: Male *C57BL/6* mice 6-8 weeks old were fed (*ad libitum*) a low AGE diet (unbaked rodent chow, LAGE) (n = 10-20) or a high AGE diet (baked rodent chow, 160 degrees C for 1h, 5-fold higher AGE content, HAGE) (n = 10-16) for 24 weeks. Urine albumin was measured by ELISA. Expression of the tight junction protein occludin was determined in jejunum by qPCR. Plasma endotoxin was measured using the Limulus Amebocyte Lysate assay. 16S rRNA sequencing of caecal extracts was used to profile the gut microbiome.
Results: Chronic consumption of dietary AGEs led to increased caecal bacterial diversity (LAGE *vs.* HAGE, mean ± SEM, 0.86 ± 0.02 *vs.* 0.95 ± 0, Simpson diversity index, $p = 0.0002$) and decreased occludin expression in the jejunum (1.17 ± 0.23 *vs.* 0.43 ± 0.08 fold change, $p = 0.003$). Plasma endotoxin was increased after high AGE feeding (1.45 ± 0.12 *vs.* 1.91 ± 0.14 EU/mL, $p = 0.028$). The HAGE diet increased urinary albumin excretion (36.04 ± 3.55 *vs.* 59.61 ± 4.05 μg/24 hours, $p = 0.0003$).
Conclusions: These data indicate that excess consumption of AGEs leads to albuminuria, which is associated with increased intestinal permeability and alterations in gut microbiome. This association remains to be fully defined. Further studies in this area are warranted.
Funding source(s): N/A.

REPRODUCIBILITY OF LACTULOSE AND FRUCTOSE BREATH HYDROGEN TESTING AND IMPACT ON CLINICAL UTILITY

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Background/Aims: Breath hydrogen testing is useful to assess colonic fermentation of malabsorbed carbohydrates and their role in symptom genesis. Specifically, lactulose and fructose breath responses can guide dietary restriction of FODMAPs (fermentable carbohydrates) in patients with irritable bowel syndrome (IBS). However, data regarding their reproducibility is limited. The aim was to investigate the reproducibility of lactulose and fructose breath tests.
Methods: A retrospective audit was conducted in 27 IBS patients completing a 15 g lactulose breath test and in 32 patients ingesting 35 g fructose. A repeat test was performed 6-8 weeks later for lactulose and ≥ 6 weeks for fructose. Changes in responses between test and retest were analysed qualitatively [positive response: 2 × ≥ 10 ppm hydrogen rise) and quantitatively as area-under-curve (AUC)] and oro-caecal transit time (OCTT). The effect of duration between testing and variability was also assessed.
Results: A positive lactulose response was maintained in 96% subjects, but 31% ($p = 0.0006$) lost a positive fructose response upon retest. Initial hydrogen AUC to lactulose and fructose were poorly correlated with hydrogen AUC values on repeat testing (lactulose: $r^2 = 0.08$, $p = 0.16$; fructose: $r^2 = 0.07$, $p = 0.18$; regression analysis). Such variations in fructose responses was independent of the duration between test and retest ($r^2 = 0.003$, $p = 0.82$. Lactulose OCTT ($r = 0.29$; $p = 0.15$; Spearman's correlation) or fructose ($r = 0.29$; $p = 0.31$) were not correlated between test-retest.
Conclusions: Poor reproducibility of lactulose and fructose breath testing was demonstrated. Making clinical decisions (e.g. malabsorptive diagnosis or to guide dietary fructose restriction) on the results of a single test cannot be justified.
Funding source(s): Fonterra™ & Yakult Australia.

CONCURRENT SESSION 18: ANTIOXIDANTS.
ANTI-INFLAMMATORY EFFECTS OF POLYPHENOL-RICH PROPOLIS EXTRACTS BY MODULATING UBIQUITINATION OF TRAF6 DURING NF-κB ACTIVATION

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Background/Aims: Propolis is a resinous product collected by honeybees from polyphenol-rich plants. It has documented antioxidant and anti-inflammatory properties although its mechanisms of action are understood poorly. In this study, the anti-inflammatory effects of polyphenol-rich propolis extracts (PPE) from China (CPPE) and Brazil (BPPE) were examined.
Methods: Folin–Ciocalteu's method and chromatographic analysis were used to compare their chemical compositions and *in vitro* antioxidant activities were measured using several different indices. The anti-inflammatory effects of PPE from China and Brazil were examined in murine endotoxin-induced inflammatory lung injury as well several cellular inflammation models.
Results: CPPE and BPPE showed differences in their polyphenolic composition and *in vitro* free radical scavenging activities. Oral administration of PPE to lipopolysaccharide (LPS)-challenged mice decreased serum proinflammatory cytokine concentrations and inhibited pulmonary nuclear factor (NF)-κB activation. Both PPE types modulated LPS-induced key inflammatory mediators and cytokine gene expression in RAW 264.7 macrophages. Reactive oxygen species (ROS) production and several inflammatory mediators were suppressed by both PPE types in a time and dose-dependent manner. In HeLa-T6RZC stable cells where NF-κB signalling is initiated at the level of TNF receptor-associated factor 6 (TRAF6), we found PPE suppressed NF-κB activation by delaying the ubiquitination of TRAF6. In an *in vitro* kinase assay system, both PPE types directly disrupted polyubiquitin synthesis by TRAF6.